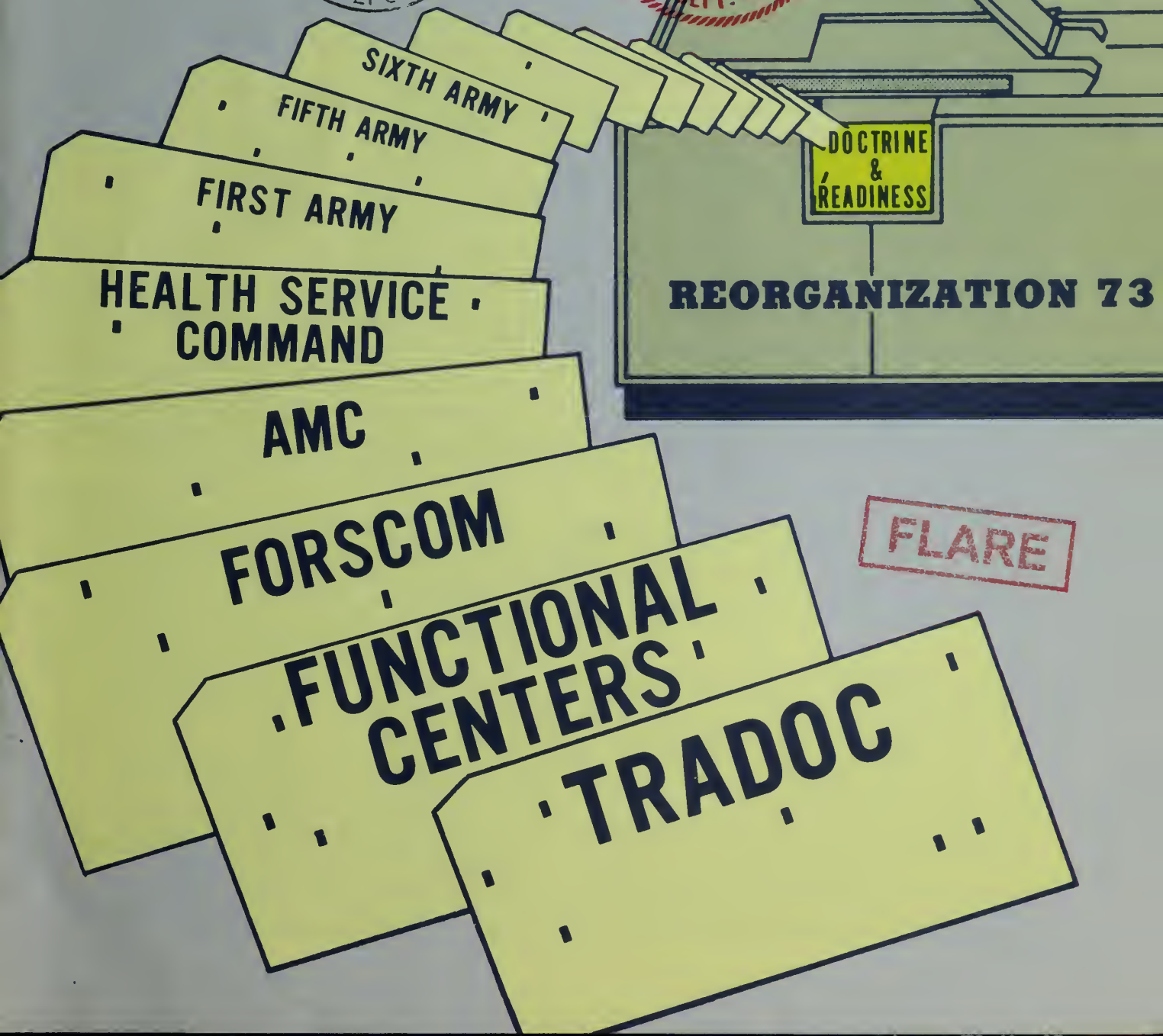
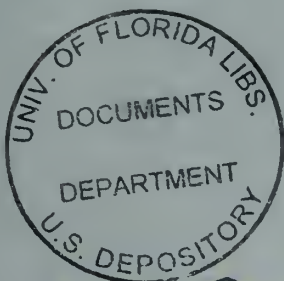


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ARROWHEAD

COMBAT DEVELOPMENTS COMMAND

January 1973





Commander's Call

OPERATION HIGHROAD

Beginning this month and during the remainder of 1973, Combat Developments Command will reorganize as part of a new concept for the organization of the Army in the Continental United States.

Our plan for reorganization, called *Operation HIGHROAD*, has been carefully prepared to make the transition from old to new as smooth as possible. Members of our *HIGHROAD* team at all echelons—the headquarters, the groups, and the agencies—have worked hard to develop this plan, and I am confident that it is the best approach to the problem. In general terms the plan provides that:

—actions vital to the future of the Army are carried on during the process of change.

—changes are affected so that the individual needs of the members of the Command, military and civilian, and their families, are met insofar as practicable.

—objectives of Department of the Army are attained.

Obviously, the plan affects everyone in CDC. Therefore, this issue of the *Arrowhead* will carry an explanation of the changes, emphasizing not only *what* is happening but also *why* such a reorganization is necessary. You will find an explanation of the specific reasoning that led to the changes and a concise summary of the moves that take us into the new organization. I

wish, also, to give you my own views of what you can do to help.

First, we must give wholehearted support to the plan. Be alert to identify any situation or event which appears to be critical or which would prevent the effective implementation of the reorganization. By early identification, we will have time to look for solutions that will eliminate or minimize adverse effects.

Secondly, and equally important, the combat developments program must be kept going while the changes are being made. This means that all senior managers must exercise caution in the relocation or disestablishment of existing activities. Each activity must remain proportionately operational until such time as newly created organizations are prepared to assume responsibility for ongoing combat developments actions.

The structure to meet combat developments responsibilities is being adjusted to today's realities of resource constraints and a decreasing numerical strength of our Army. We cannot forget for a moment that the Soldier of the future is depending on us. Our implementation of the reorganization plan must do everything possible to maintain CDC's momentum and put the American Soldier on tomorrow's battlefield with minimum risk and maximum success!

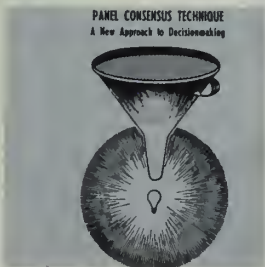


JOHN NORTON
Lieutenant General, US Army
Commanding

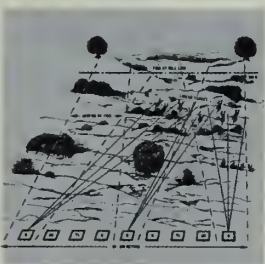
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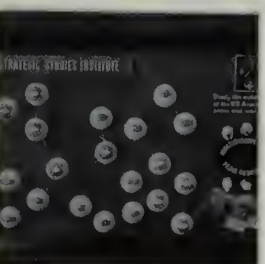
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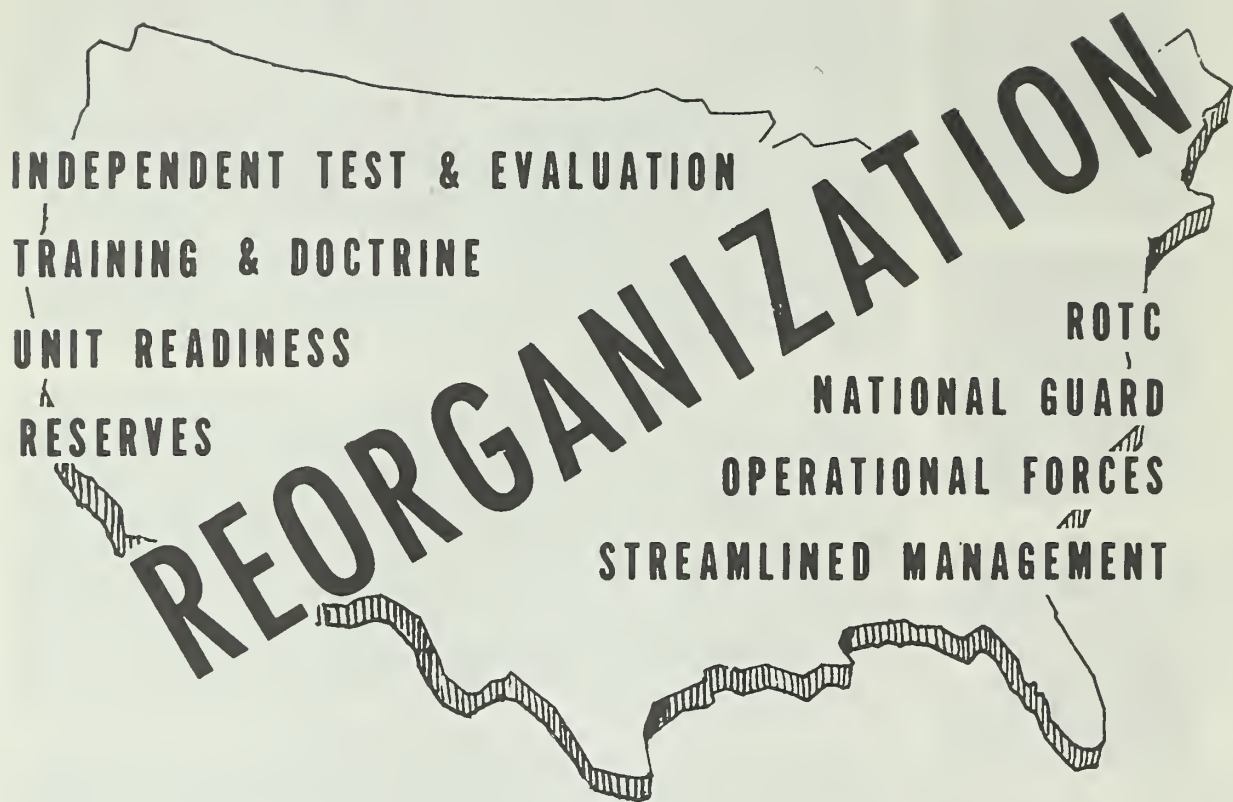
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PICTURE CREDITS: All photos, US Army photographs.

ABOUT THE COVER

The front cover illustrates many of the important aspects of the Army reorganization.

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"CDC's reorganization's not a change of mission, merely a change of pace---faster," is how one Army management expert explains it. "New ideas, doctrine and systems will get to the user faster because the developments process will be simpler and more responsive to good management principles."

Like many other military and governmental functions now undergoing change, our Army, too, is to be smaller--but still more effective. Thus, some combat activities will be pulled out of the eddies into the main stream of effort toward improving our Army's combat clout. By simple redirection, most activities will have many obstacles removed from their channels.

While the current reorganization may appear to have far-reaching overtones and concerns itself with a broad restructuring of our Army "at home," many readers are presently mulling over "smaller" questions like "what does this mean to CDC?"

Despite many previous "overviews" of the Army's reorganization, the best way to understand what's happening to CDC is to note what's happening to the Army itself.

No-where-no-way is our Army's mission changed. It's still to provide highly effective combat strength on-the-ready-line.

The goal of reorganization is to achieve this more effectively, with a smaller Active Army, responsive reserve forces and sound management of Army resources.

The reorganization involves all three of the major Army Commands---the Continental Army Command (CONARC) at Fort Monroe, Virginia; the Army Materiel Command (AMC) in Alexandria, Virginia; and the Combat Developments Command (CDC) at Fort Belvoir, Virginia. The Army's medical services, communications and electronics functions, and personnel operations are affected. The major changes include the replacement of the Continental Army Command and the Combat Developments Command with two new commands--Training and Doctrine Command (TRADOC) to be located at Fort Monroe and Forces Command (FORSCOM) which will move into the Third Army's present headquarters at Fort McPherson. Third Army Headquarters will be consolidated with First Army at Fort Meade, Maryland, leaving the CONUS with First-Fifth and Sixth Armies as shown on the map.(Figure 1)

TRADOC, to be composed of about 180,000 military and 40,000 civilian personnel, will be responsible for individual training and schooling which

means it will command the basic training center and 26 service schools, such as the Infantry School at Fort Benning and such specialized activities as the Defense Information School. In addition to commanding all installations where the major activity is training-related, TRADOC will also be responsible for the individual training of reserve forces and administering the ROTC program of 291 Senior and 623 Junior units.

Other changes in overall Army communications-electronics activities, recruiting and personnel operations will be by-passed in this writing. Our focus now is on a primary area of interest--the establishment of TRADOC which parallels the disestablishment of CDC and CONARC.

At Headquarters, CDC, selected developmental functions, along with selected CONARC headquarters' functions will be amalgamated in the new TRADOC headquarters at Fort Monroe, Virginia. The new headquarters organization will be as portrayed by Figure 2. Of particular interest is the organization for the Deputy Chief of Staff for Combat Developments (DCS-CD) within this headquarters. This latter organization is depicted at Figure 3.

The familiar-appearing titles for the Directorates and many of the Divisions would indicate that the DCS-CD at TRADOC is, in effect, a "distilled" CDC Headquarters. However, the process was not quite that simple. Nor is it simple to explain how the amalgamation-metamorphosis of other CDC elements and activities will be accomplished. It would help to mention two new organizations coming on the scene which will play a role in the restructuring and distribution of combat developments activities.

They are two agencies created by Assistant Chief of Staff for Force Development (ACSFOR): the Concepts Analysis Agency (CAA) and the Operational Test and Evaluation Agency (OTEA).

CONUSA BOUNDARIES

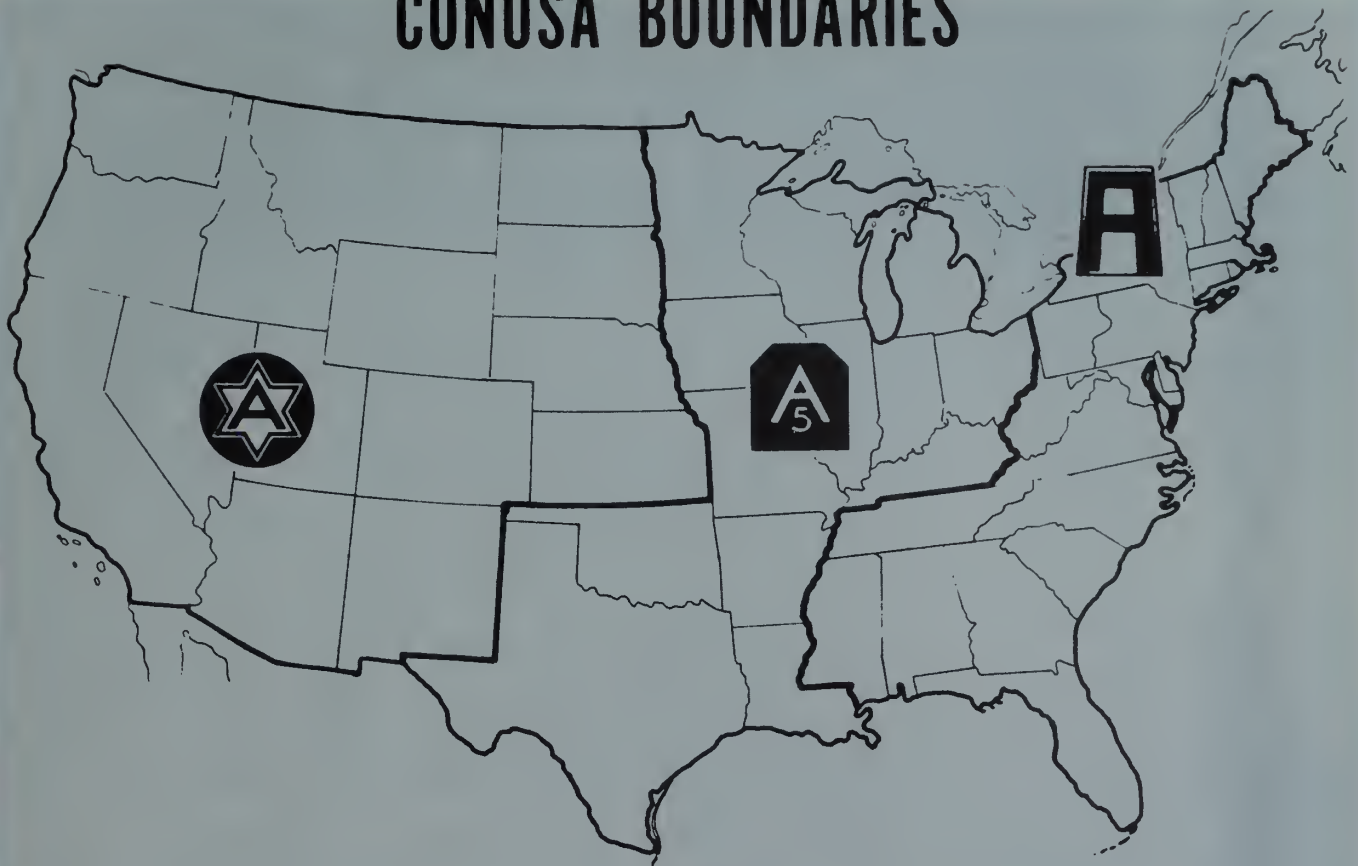


FIGURE 1

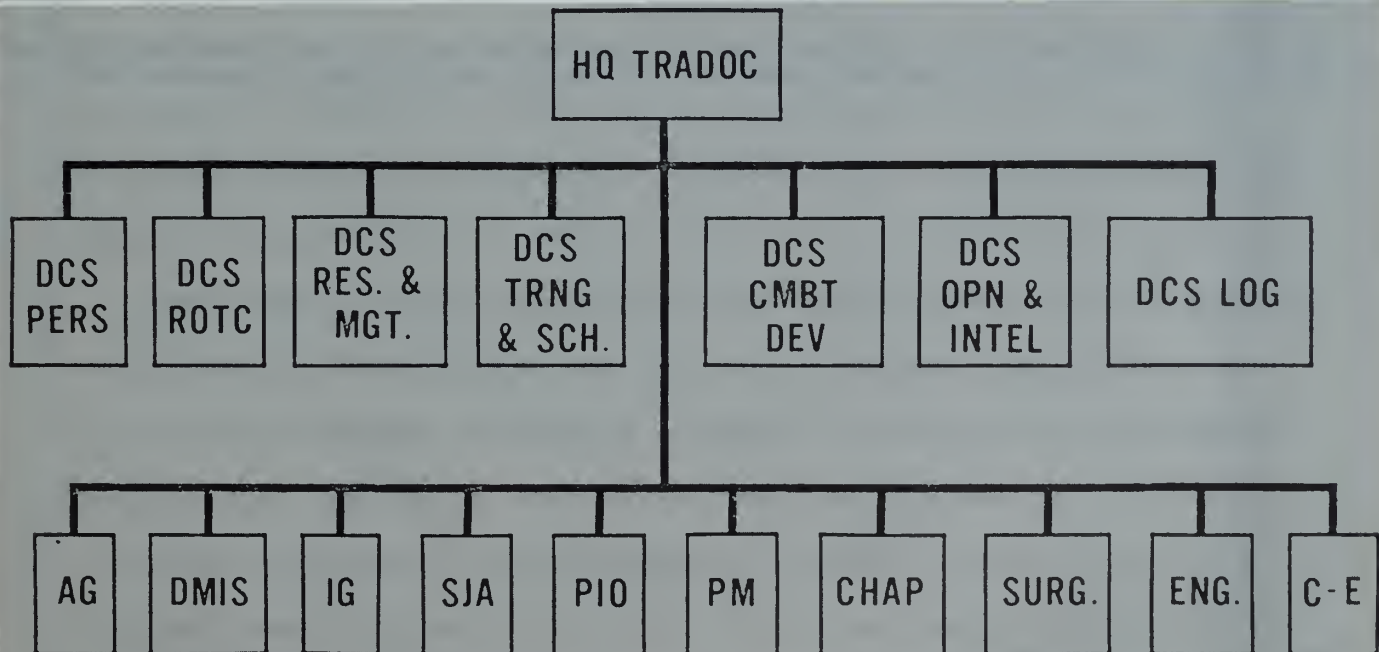


FIGURE 2

HQ TRADOC:

There are seven Deputy Chiefs of Staff and Special Staff who will help TRADOC perform the individual training and education roles for the Army as well as combat developments. This headquarters will command 26 schools, four ROTC Regions and all installations where the principal activity is training.

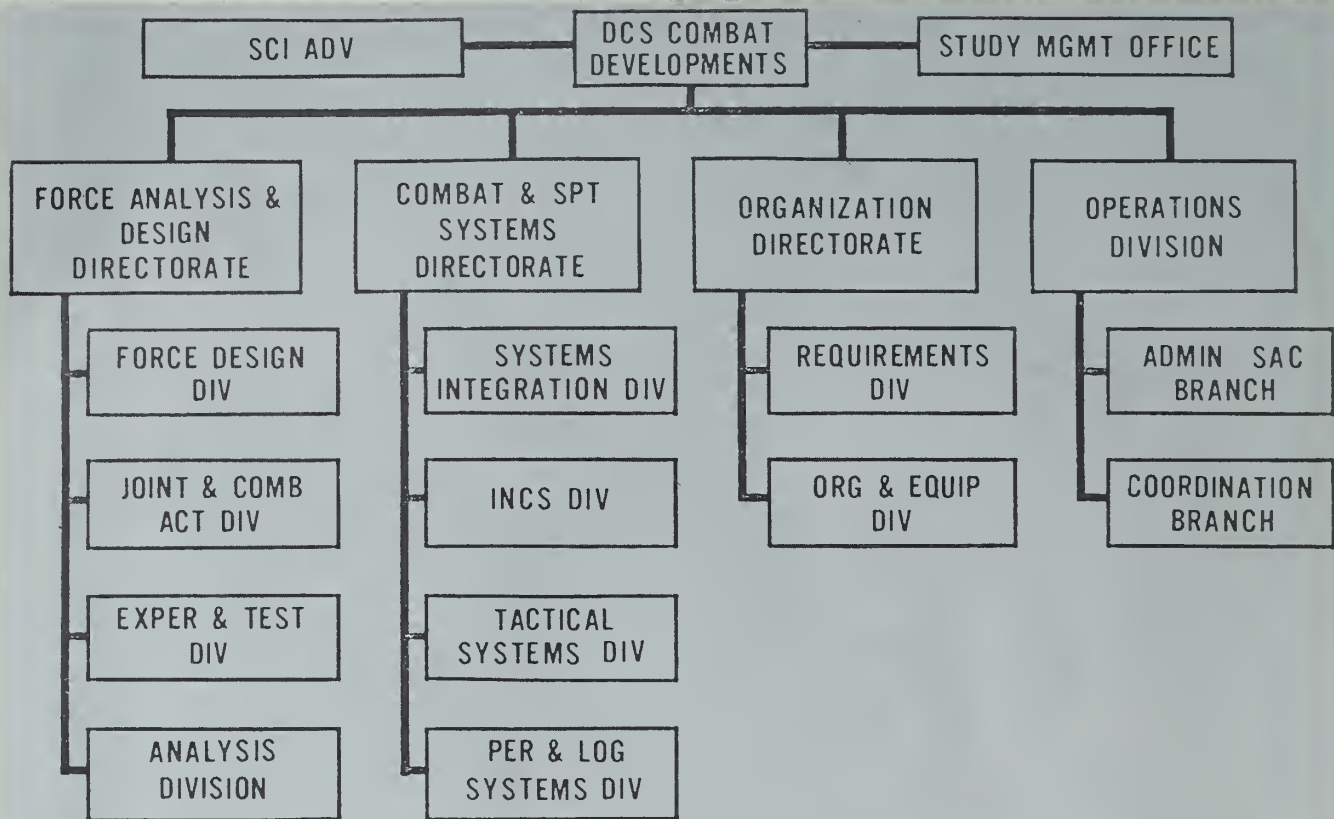


FIGURE 3

DCS-CD

From CDC to DCD—Deputy Chief of Staff for Combat Developments. The two-star organization shown here indicates that very few of CDC's present tasks will be abandoned. DCS-CD might even be called a "miniaturized CDC"

Strategic Studies Institute (SSI) will become an integral part of the Army War College (AWC). Its present structure will be increased in size to provide for an environmental and threat capability and an increased study capability. The Army War College will be a DA Field Operating Activity under the proponency of DCSOPS-DA for the Army Chief of Staff.

Combat Developments Experimentation Command (CDEC) will become a major subordinate command of TRADOC; its Experimentation Brigade will be restructured into a TDA Experimentation Support Group. The present CDEC function of providing test cells for operational testing will be transferred to the new Test and Evaluation Agency, the DA Class II activity responsible for strengthening the overall materiel acquisition process.

The redistribution of resources of CDC's unique Mid-management Groups has the majority of the Concepts and Force Design Group (CONFOR Gp) functions distributed to the new Concepts Analysis Agency, principally those associated with the long range study effort and CONAF (Conceptual Design of the Army in the Field). Additional transfers will provide a share of the administrative support required by the CAA, and a share of the spaces required for technical support of task forces involved in the materiel acquisition process. Other functions will be transferred to the Combined Arms Center (echelons above Division), the Logistics Center (High Level Logistical Support Concepts), and HQ TRADOC (threat/technology)--the first two being newly-created functional centers to be discussed.

The Combat Systems Group (COMS Gp) will combine with the Command and General Staff College (C&GSC) to form the new Combined Arms Center (CAC) at Fort Leavenworth. Functions will, therefore, remain on site; selected functions from CONFOR Gp and INCS Gp will be added. The CAC will be one of the integrating functional centers of TRADOC and will command the Nuclear Agency.

A major portion of the Intelligence and Control Systems Group (INCS Gp) functions will be allocated to the CDC, Fort Leavenworth, to form a directorate for Intelligence and Control Systems. Functions pertaining to the development of operational doctrine, organization, and materiel needs, as well as proponency of them, will be allocated to the Intelligence School or Signal School as appropriate.

The principal functions and manpower resources associated with the Personnel and Logistics Systems Group (PALS) will be utilized to form the new US Army Logistics Center (LOGC) at Fort Lee, Va. Excepted will be

those functions associated with personnel and administration which will be transferred to a third functional center, the new Administration Center (ADCEN) at Fort Benjamin Harrison, Ind.

Tasks presently performed by the Systems Analysis Group (SAG) will be decentralized and transferred to form integral parts of new CONUS elements. The SAG field offices, presently at Fort Leavenworth and Fort Lee, will be incorporated into the CAC and LOGC personnel ceilings respectively. Functions necessary to the Concepts and Analysis and Operational Test and Evaluation Agencies for analytical support will be provided, and similar functions will also be provided to HQ, TRADOC for analytical services and expertise to the new headquarters. Certain schools will also be provided SAG functions commensurate with their developmental tasks. (The "Hand-over Plan" for the Groups is at Figure 4). The "hand-over" of CDC's Agencies is expected to be relatively simple. They will mostly be combined with their associated schools, in place, and with full transfer of functions.

However, these several exceptions should be noted.

The Military Police Agency, while combining with the Military Police School, will relocate with the school from Fort Gordon to Fort McClellan.

The Chemical-Biological Radiological Agency will combine with its associated school at Fort McClellan and relocate with the school to Aberdeen Proving Ground as part of the Ordnance School.

The Nuclear Agency will retain functions and status as an agency, and be subordinate to the CAC, Fort Leavenworth. No change in station is anticipated.

The Personnel and Administrative Services Agency's functions will be transferred to the Adjutant General and Finance Schools at the Adminis-

CURRENT CDC GROUP	GAINING ACTIVITY
COMS	COMBINED ARMS CENTER (CAC)
INCS	COMBINED ARMS CENTER (CAC)
PALS	LOGISTICS CENTER (LOGC)
CONFOR	CONCEPTS ANALYSIS AGENCY (CAA)
SA	TRAINING & DOCTRINE COMMAND (TRADOC)
SSI	ARMY WAR COLLEGE (AWC)
CDEC	TRAINING & DOCTRINE COMMAND (TRADOC)

FIGURE 4

GROUP LEVEL DISPOSITION

CDC's Groups filled with unique and specialized talents do not combine and amalgamate as easily as do the Arm-Branch agencies. Illustration shows how these "resources" will be distributed within TRADOC and its Functional Centers. The Personnel and Admin Services Agency of PALS will transfer to the Admin (Functional Center) while some of Systems Analysis Group's "cells" may relocate at several points in TRADOC.

tration Center (ADCEN) at Fort Benjamin Harrison. No change in station is anticipated. (Both schools will be part of a merger that will create the Institute of Administration).

The Supply Agency functions associated with the development of long range operational and organization doctrine for supply and materiel systems, MIS, and major multi-command materiel management systems will be incorporated into the Logistics Center (LOGC) at Fort Lee. The remaining functions will be transferred to the Quartermaster School.

The Maintenance Agency (MA) functions and organization will be re-configured into a Directorate Staff element of the (LOGC) and remain in place as a tenant at Aberdeen Proving Ground. Those functions associated with materiel testing and review of related equipment publications in proponent areas of weapons and mobility will be transferred to the Ordnance

Center and School. Explosive Ordnance Disposal (EOD) service and the maintenance of conventional ammunition functions will be transferred to the Missile and Munitions Center and School. The MA's Missile and Munition Division currently located at Redstone Arsenal will be moved to Aberdeen.

The Communications-Electronics Agency, while combining with the Signal School, will relocate with the school functions to the Southeastern Signal School.

And finally, one of CDC's "little-but-mighty" agencies, Judge Advocate at the University of Virginia, is to be deactivated and its resources transferred to the JAG School in Charlottesville. Figure 5's left-hand corner shows how the legacy of combat developments is to be continued when the CDC Agencies rejoin their school.

Now for the "people effect" of the reorganization. Plans at all stages were undertaken from the obvious premise that personnel turbulence is not only mission-obstructing but also expensive. Thus military and civilian transfers are to be held to a minimum. However, where personnel are to be affected by transfer, reduction or deletion of function, their full rights and privileges are accorded them under Federal and Army regulations. Existing and newly formed management machinery is in operation to reduce impact in the redistribution of personnel. At the top level is a Personnel Coordination Center conducted by the Deputy Chief of Staff for Personnel (DCSPER) to coordinate civilian and military personnel activities.

In addition, Department of the Army Briefing Teams under the Office of Personnel Operations and Director of Civilian Personnel are now visiting and available to major activities affected by the 73 reorganization. More details are being supplied as critical dates are approached.

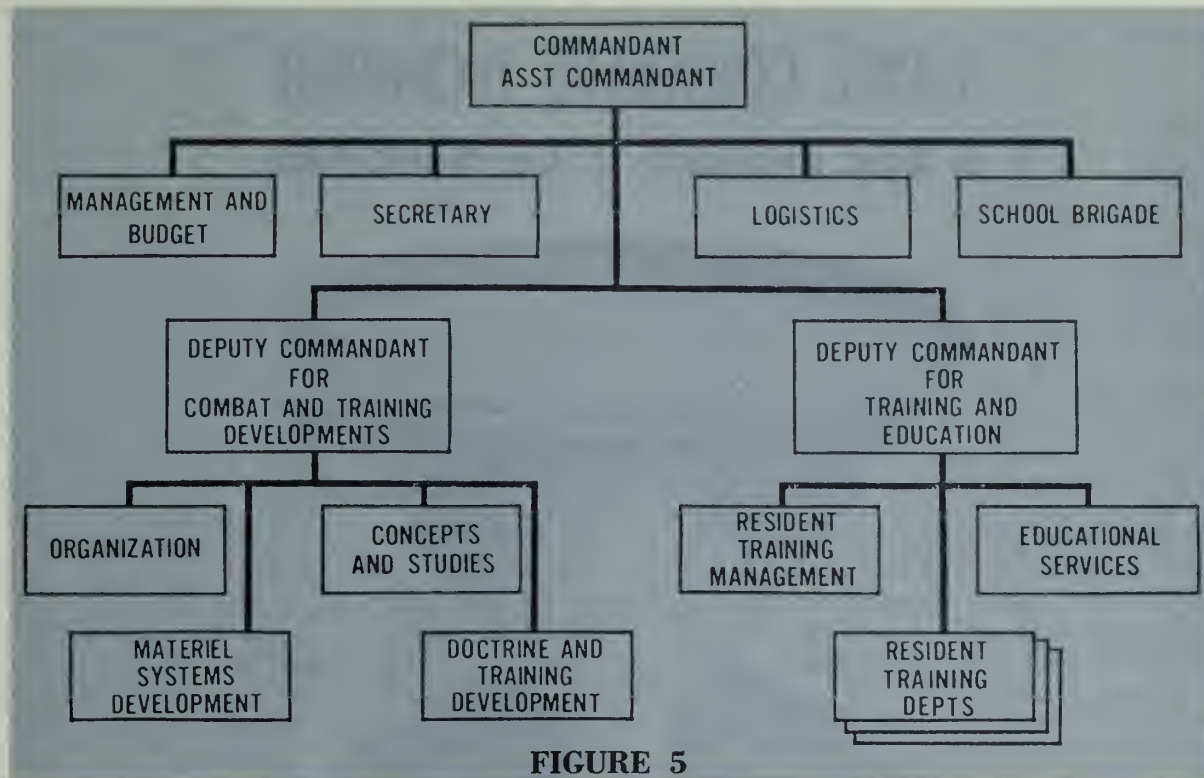


FIGURE 5

SCHOOLS MODEL

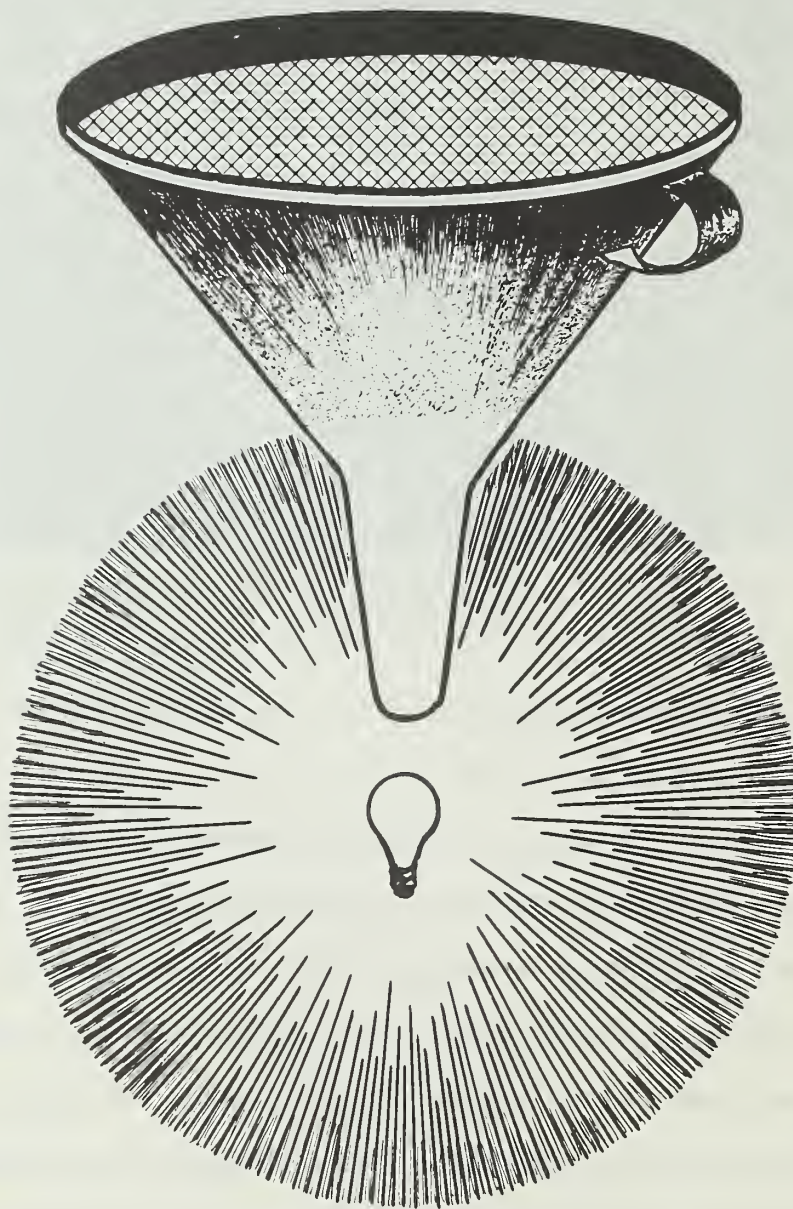
On 1 March 73, all but three of CDC's 19 branch-expertise agencies will combine with their own arm or service schools (where they've been all along anyway). Lower left of this illustration shows how the former agencies will function in the school mode.

This then is how the new picture of combat developments is evolving--a task that thus far has required 185 activities to be programmed through CDC's computer alone. If the goal of reorganization is more tangible readiness at less cost, more effective training and support of the individual volunteer Soldier, and better management of all resources for a modern Army, then combat developments must continue to play a heavy role. Innovative ideas realistically guided from inspiration to implementation, will now be more essential than ever. The new deployment of CDC's creative/managerial talent indicates that No idea will die of malnutrition under TRADOC.

Nor will CDC in its new role let the developments system lose sight of the one man who will always know if the system has worked--The ultimate User--the man who's not being reorganized because he's the constant in the system--the Individual Soldier. Ⓐ

PANEL CONSENSUS TECHNIQUE

A New Approach to Decisionmaking



Editor's Note: This is the final article in a series by Lt. Dennis Sharp on the Strategic Studies Institute at Carlisle Barracks, Pa.

A top level Army planner, faced with an unwieldy proliferation of projects under his command, feels that a restructuring of priorities is needed. He needs to know what problems the Army will face within the next five to ten years. He needs to know which projects should be accelerated, which should be eliminated, and which

could be combined with other projects. He needs to know this in the shortest possible time.

There is no single person in the command with a total grasp of the entire operation. The command is too complex and diverse for that. And yet, if a committee is appointed to study the matter, how can they avoid the tendency of committees to weaken decisions through compromise, at a tremendous cost in manpower, time, and innovativeness?

One way to get many people working together to solve a problem, while avoiding the pitfalls of the committee, was recently developed and used by the Strategic Studies Institute. The method, called the Panel Consensus Technique, was devised by Charles W. Taylor, a foreign affairs research analyst at SSI.

"We were tasked by CDC," Mr. Taylor said, "to come up with the five ideas to improve the US Army capability in the 1976-1982 time frame. Using the technique, the Institute obtained more than 250 ideas from students in the Army War College, screened them, selected the five best, and sent them to the Commanding General of CDC within a week."

How does the Panel Consensus Technique accomplish this? Essentially, the technique is an "idea funnel," a method by which many ideas can be processed to achieve consensus. The Panel Consensus Technique contains five distinct levels: ideate, screen, select, refine, and decide. STEP 1. Ideate.

At the ideate level, individuals supply ideas for solving the problem. Where do they get the ideas? Preferably, they meditate on the problem for at least 24 consecutive hours. They identify so thoroughly with the problem that uninhibited thinking into solutions can be achieved. The result is the solution that the individual considers most feasible, practical, and capable of implementation.

The way the idea is presented will make it either harder or easier for decisionmakers to recognize its value. The following format is used: (1) Title; (2) Problem Identification; (3) Idea: the writer's proposed solution to the problem; and (4) Implementation: Ideas about how the idea might be put into use. The originator's name is not on this paper, which should not exceed two pages.

All ideas are received by the controller, who assigns a random code number to conceal source identity and eliminate personality and status as decision factors. After processing begins, no additional ideas may be accepted into the screening procedure.

STEP 2. Screen.

The repeated reviewing and weighting of values that occur at all panel levels proceeds in the following manner: Using a round robin method, each panel member will read each sub-

mitted idea and privately rate it from 1 to 5, with 5 being the highest rating. Private balloting is done on individual score sheets for each panel member.

The screen level is the first review level. At the Army War College this level is made up of about 15 committees, each consisting of 15 members of the student body. Each committee is assigned a monitor and is given an equal number of ideas to process. The task of the screen panels is to narrow down the number of ideas. The committees are allowed three to four hours to complete their task. Only their final selections, the five best ideas from each committee are processed by the controller. If each of the 15 screen committees selected five proposal as best, each of the next panels would receive a set of 75 proposals to process.

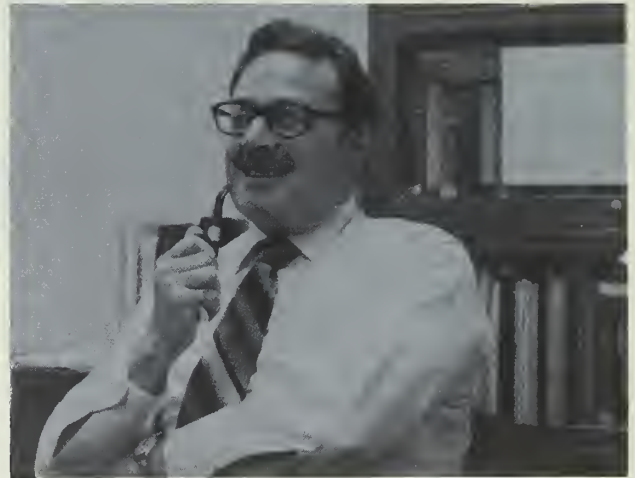
STEP 3. Select.

The select level is made up of three panels, each with five rating members and a monitor. Membership at this level is drawn from middle management levels. Bias is reduced by having each panel evaluate an identical set of proposals and by staffing each panel with members of different disciplines, experience and interests. In about four hours each panel selects five of the ideas passed on to it from the screen level. Each of the final selections must be justified to assist higher level panels in their selections. Although the select panels evaluate identical sets of ideas, they rarely select the same ideas as best.

STEP 4. Refine.

The refine level, the first involving executive decisionmakers, is also staffed with five rating members and a monitor. Its members are upper-middle-level executives. The task of the refine panel is to select the five best ideas from the 15 preferred ideas of the select panel. The panelists are allowed more freedom than previous panels. These panel members not only rate each idea on its merits, but may also clarify the logic of some ideas, expand on the thought of others, and synthesize the thoughts of several, provided they do not change the substance of the ideas. Each of their final selections also must be justified. Since the panelists at this level know specific organizational policies, some proposals will be eliminated as impractical because of factors that would not have affected selection at a lower level.

"The panel consensus technique forces a face-to-face encounter of managers, experts, and decision-makers who normally do not work together."



STEP 5. Decide.

The actual decision is made at the decision level. The decide panel consists of five rating members and a monitor. It is staffed with the top managers of the organization. The task of this panel is to select, during a four-hour session, one or more of the proposals that have been screened through the Panel Consensus Technique. The task is accomplished in the same manner as on other panels, reviewing and assigning weighted values. Discussion of the ideas is unlimited, implementation is thoroughly explored, and tradeoffs may emerge. The justification statements play an important part in the panel's decision, because they represent a consensus of the best judgement of the lower panels. Since panel identity has been concealed by the controller, the decide panel is totally unaware of idea source.

The decide panel is not bound to accept any of the ideas and may return them for reconsideration by appropriate panels.

THE CONTROL PANEL

To avoid overlooking a good idea and to provide checks against possible bias in the system, control panels are set up with membership uniquely separate to the standard panels. The task of the control level is to consider *all* ideas originally submitted. Its task is accom-

plished over a longer period of time, 16-20 working hours, because of the volume of the work involved.

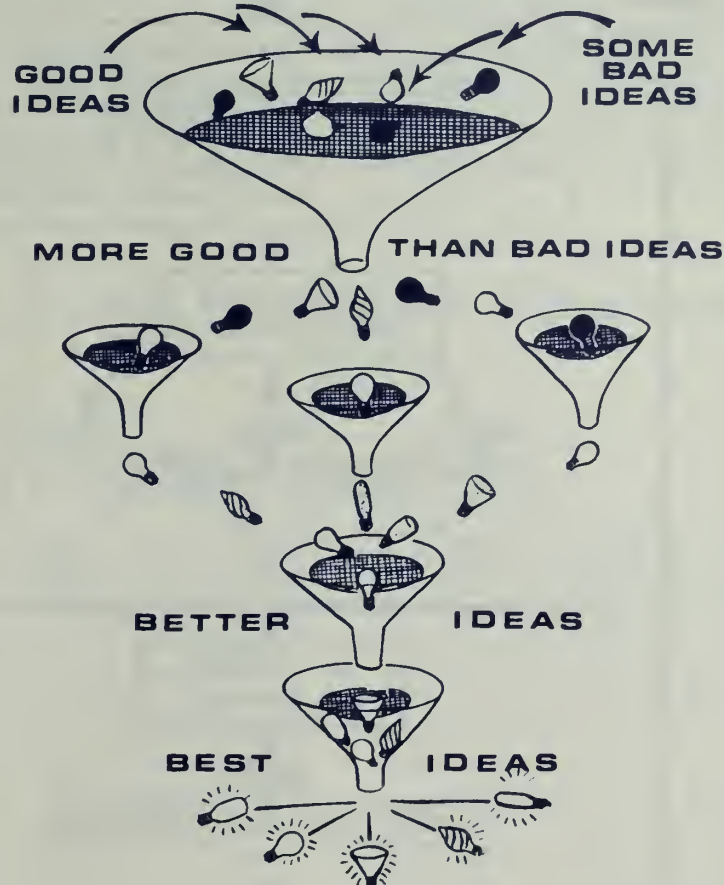
The control panel rates the ideas until it selects the five best. Since this panel's selections are passed directly to the decide panel, the control panel may also clarify the logic of its final selections, provided the substance of the ideas is not changed. The control panel is required to justify each of its final selections.

WHO USES THE PANEL CONSENSUS TECHNIQUE?

Since the Panel Consensus Technique was developed in 1970, and further theory developed by Mr. Taylor, it has gained wide acceptance. Articles on it have been published in management and behavioral journals. Details of the technique have been distributed to several agencies within CDC, such as CONFOR. In addition to CDC, it has also gone out to the Command and General Staff College, and was used by the Army War College in a 1972 study for the Army Chief of Staff on Army Tasks in 1975. One of the chief users of the system has been Jack C. Whiting, from the Federal State Planning Board of West Virginia.

Descriptive details of the technique have gone to Fort Hood, the Armed Forces Staff College, the Army Chaplain Board and the Chaplain

THE IDEA FUNNEL



School, and to the Combat Developments Initiative Board. It has gone to Dickinson College, located at Carlisle Barracks, Pennsylvania. In a day when more and more students wish to participate in the decisionmaking process, the Panel Consensus Technique offers an opportunity for a greater number of students to become involved. The Infantry School requested the technique for use in leadership training. Copies have been sent to the Sloan School of Management at M.I.T. It has gone to the Bureau of Business Research at Wayne State University. Also information on it has gone to Poland, through student representatives from Warsaw attending universities on exchange programs in the United States. "I have no idea how they

would go about handling it in a communist-society," Mr. Taylor said. "I expect any day now that they are going to 'discover' the method."

BENEFITS OF THE PANEL CONSENSUS TECHNIQUE.

The system is designed solely for an organizational situation. The principal feature of it is that the decisionmaker at the top is able to acquire a consensus of the experts in his organization. Not only is it useful in a large organization receiving a thousand ideas, but also in a small organization receiving fewer ideas—a group as small as fifteen has been able to use this technique by recycling panel tasks internally.

continued page 17

THE PANEL CONSENSUS TECHNIQUE

ACTION LEVELS:

IDEATE

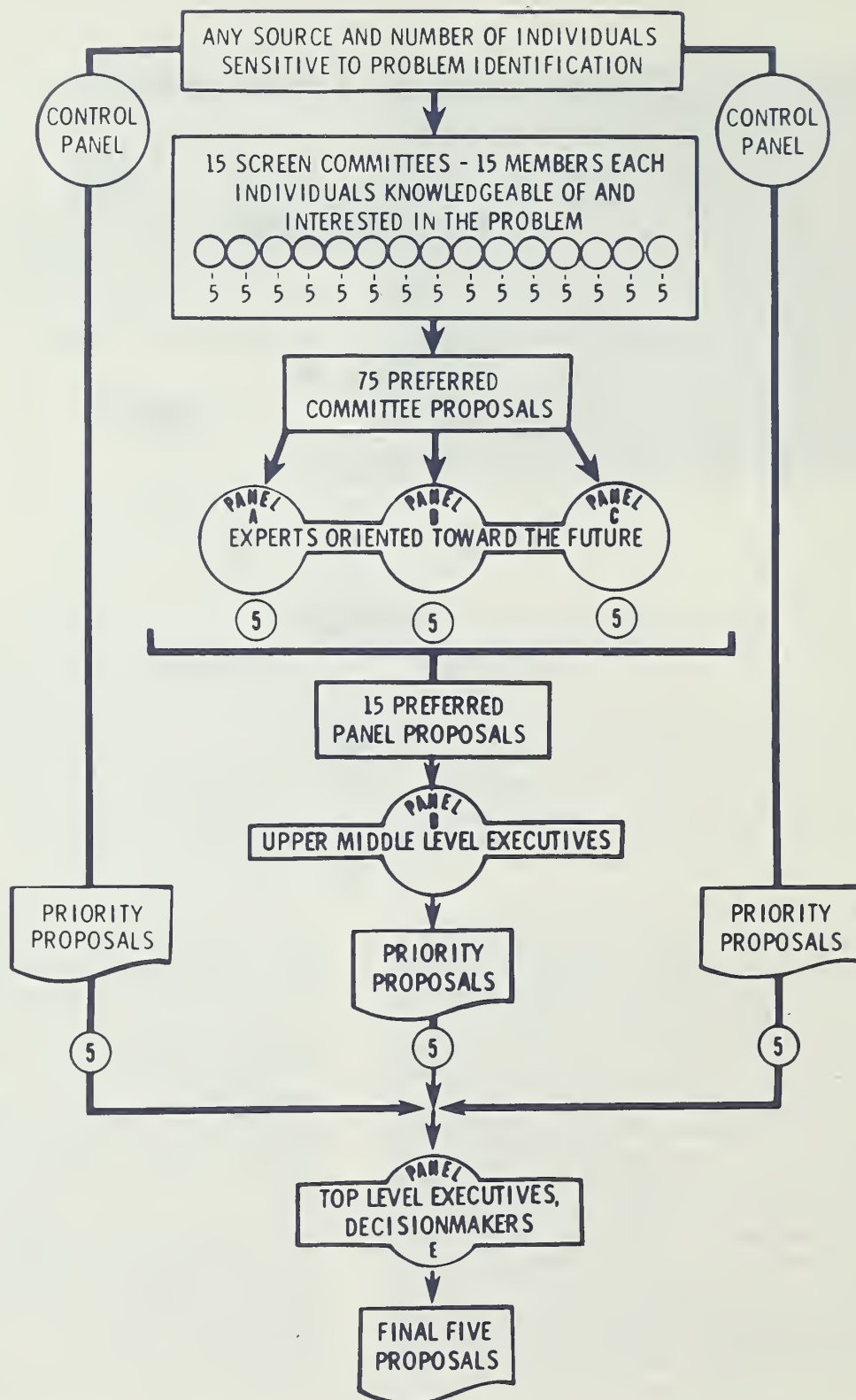
CONTROL
REVIEW

SCREEN

SELECT

REFINE

DECIDE



In summarizing the value of the Panel Consensus Technique Mr. Taylor said, "It forces a face-to-face encounter of managers, experts, and decisionmakers who normally do not work together. During the discussion of ideas, agreement and dissent occur; dominance may be sought, only to be suppressed by the private rating system. Each member experiences a sense of self-awareness and develops an acceptance of the other members on the panel, a greater open-

mindedness to new approaches, and to tolerance of the ideas of others."

But primarily, because it enables people to make decisions together while avoiding the pitfalls of the committee, the Panel Consensus Technique is one more example of how the people at SSI are finding new tools, new ideas, and new strategies with wide utility for our changing world.

The Panel Consensus Technique

VS

The Committee

1. In a committee, the person who shouts loudest and longest dominates the decision.

In the Panel Consensus Technique, each member votes by private ballot. Each idea is rated by each individual on a scale of 1 to 5, 5 being the highest score. No one has a louder vote than anyone else. Each panel has a monitor appointed whose job is to make sure the procedure is followed and to handle the administrative duties; tabulating the scores and identifying the high-scoring ideas; and limiting the discussion. The monitor remains neutral at all times, he neither votes, nor discusses the ideas. But he's a built-in safeguard against many of the abuses of the committee system.

2. In a committee, the ideas of a man senior in authority or perceived expertise are frequently given more consideration than the ideas of others.

In the Panel Consensus Technique, the ideas submitted to the screening panel are identified only by a code number. Since it is impossible to determine who submitted the idea, it is impossible to discriminate in favor of the superior. In addition, since the person who submitted the idea has no fear of recrimination, a greater amount of ideas will be submitted, and more creative solutions will be explored.

3. In a committee a good idea is often weakened through compromise until the final result

bears little resemblance to the original idea.

In the Panel Consensus Technique, once an idea enters the system it remains unchanged until the end. In addition, it is a closed system. Once the screening of ideas begins, no new ideas are permitted. This avoids watering down the original idea through compromise, additions, or deletions.

4. In a committee, a deadlock often occurs in which two or more members cannot reach agreement. As a result, nothing is decided.

In the Panel Consensus Technique, there can be no deadlock since idea selection is based on the assignment of weighted values. All panels are staffed with an odd number of members. Although no upper limit has been determined, 15 appears to be suitable for the first decision panel, and five is more appropriate for all the others.

5. In a committee, there is a tendency to talk the problem to death by bringing in many non-essential items of information and never getting around to other, more essential topics of discussion.

The Panel Consensus Technique avoids that by imposing a time limit in which the panel must make its selection. Although allowed to be somewhat flexible, it pressures the panelist towards decisions. The monitor insures that all discussion is related to the problem at hand.

The ASARS Battle Model

By Seymour L. Goldberg

Throughout its history, our Army has maintained an intense interest in small arms. To coordinate and control the Army-wide efforts to improve small arms, the Army Small Arms Program (ARSAP) was established in 1968. The Army Small Arm Requirements Study (ASARS) which examines small arms from the user's viewpoint is a major project within the ARSAP for which USACDC has responsibility and the Infantry Agency has proponentcy. Systems Analysis Group was designated to furnish operations research support to the Infantry Agency for this study. The largest operations research task in support of ASARS is the development of a simulation model.

A simulation which addressed small arms without considering the way they would be used would produce information of questionable validity. Therefore, the ASARS Battle Model would have to look at small arms in Infantry Combat, the environment in which they would be expected to play a significant role.

For a simulation of Infantry Combat to be of value, it must be of very high resolution. This need has previously prevented the development of a good infantry model. The advent of the third generation computer, plus increasing knowledge of combat modeling, now makes such a model possible and Systems Analysis Group has embarked upon its development.

In the past, models of the resolution and complexity of the ASARS Battle Model have been prepared by private contractors. With the estab-

lishment of the Combat Developments Command Systems Analysis Group, there is now an in-house capability to perform this work. Hence, the development of the ASARS Battle Model makes two advances: one, the construction of a high resolution model of dismounted infantry combat and two, the in-house development of a large scale computer model.

The model development was divided into three Phases: A, B, and C. (See Figure 1) Phase A was the construction of the executive routine. This routine is the brain of the model, which directs its every activity. The executive routine deals with an "element", the element being the individual Soldier. Each element has a clock time, the "current element" being the one with the lowest clock time. When the element becomes current it makes the trip through the executive routine, testing as it goes. If a particular submodel applies to the element, the computer executes the applicable portion of the program. There always will be something for each current element. Its action will generate a new clock time at which it will again be examined. The executive routine treats four of the five functions of land combat (the fifth, logistics, is also played but its play at the Infantry small unit level does not warrant a separate submodel).

In phase B, each block in the executive routine is broken down into increasingly smaller steps of logic. The flow charts interject substantive matter into the model. Basic ways of moving, firing, and communicating are flow

Mr. Goldberg is Director of Analysis Group 2, Systems Analysis Group, Ft. Belvoir, Va.

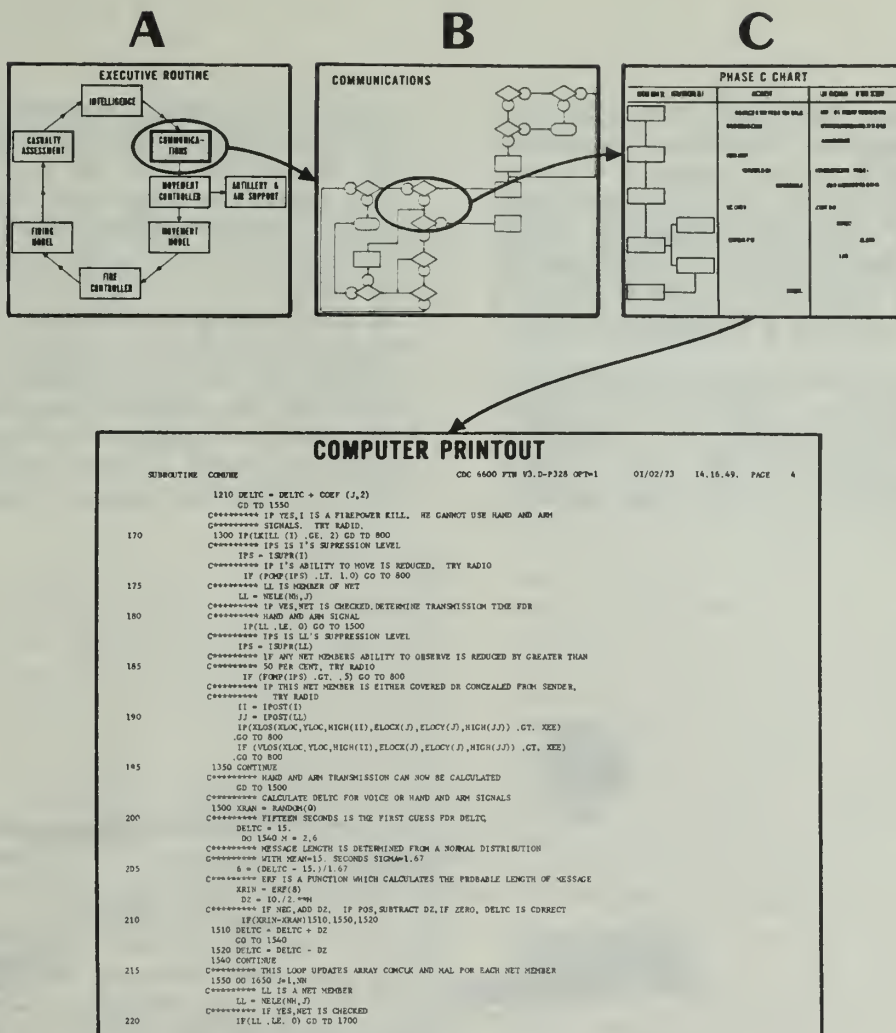


Figure 1

charted. For each of the processing blocks in the executive routine—a total of eight in all—a flow chart similar to, but in greater detail than, the executive routine is prepared.

Once the Phase B flow charts have been developed, the information within the flow charts must be programmed for a computer. The gap between the flow chart logic and the computer program is bridged by the Phase C chart. A block or group of blocks on the Phase B chart is expanded in the final and most detailed logic breakout so that it may serve as the source for the computer program.

Documentation has been a major problem in the development of large models. People are transferred, notes are lost, and the meaning of large portions of the model must be reviewed

and even rediscovered when final documentation is being prepared. In order to avoid this pitfall, the Phase C chart format has been developed. It contains three columns. The left hand column is the detailed flow chart, expanded from the Phase B flow charts, which permit direct coding for the computers. The middle column is a description for the user of the subroutine meaning. The right hand column lists the input necessary to run the model. The Phase C charts are kept current. At any stage of the development, the model contents are known. The computer program listing is an integral part of the Phase C chart. Additionally, the usual problems of final documentation are minimized or eliminated.

After completion of all Phase C programs, they were tested by actually running them on

the computer, using "ball park" data. This process, called "debugging", was time consuming, but was an essential step in operation of a final and integrated model. In spite of the great care in preparing the model, the debugging showed many areas in each sub-model which needed correction. The completion of this task on 14 December 1972, marked a milestone in model development.

It is planned that the ASARS Battle Model be operational in January. Because of the nature of large computerized models, it is difficult to make firm predictions about the period of sensitivity and acceptance. It is hoped that increased

controls and careful documentation will permit sensitivity analyses and acceptance by 1 April 1973. One of two courses will then be taken: either immediate production runs or expansion of the model for additional play of tanks, anti-tank weapons and bunkers, followed by production runs.

A few of the great number of technical problems overcome for the first time during model developments are of particular interest:

—In the past, detailed play of assault has not been attempted because of the difficulty of depicting elements in close proximity to each other. In infantry Combat, the assault can be

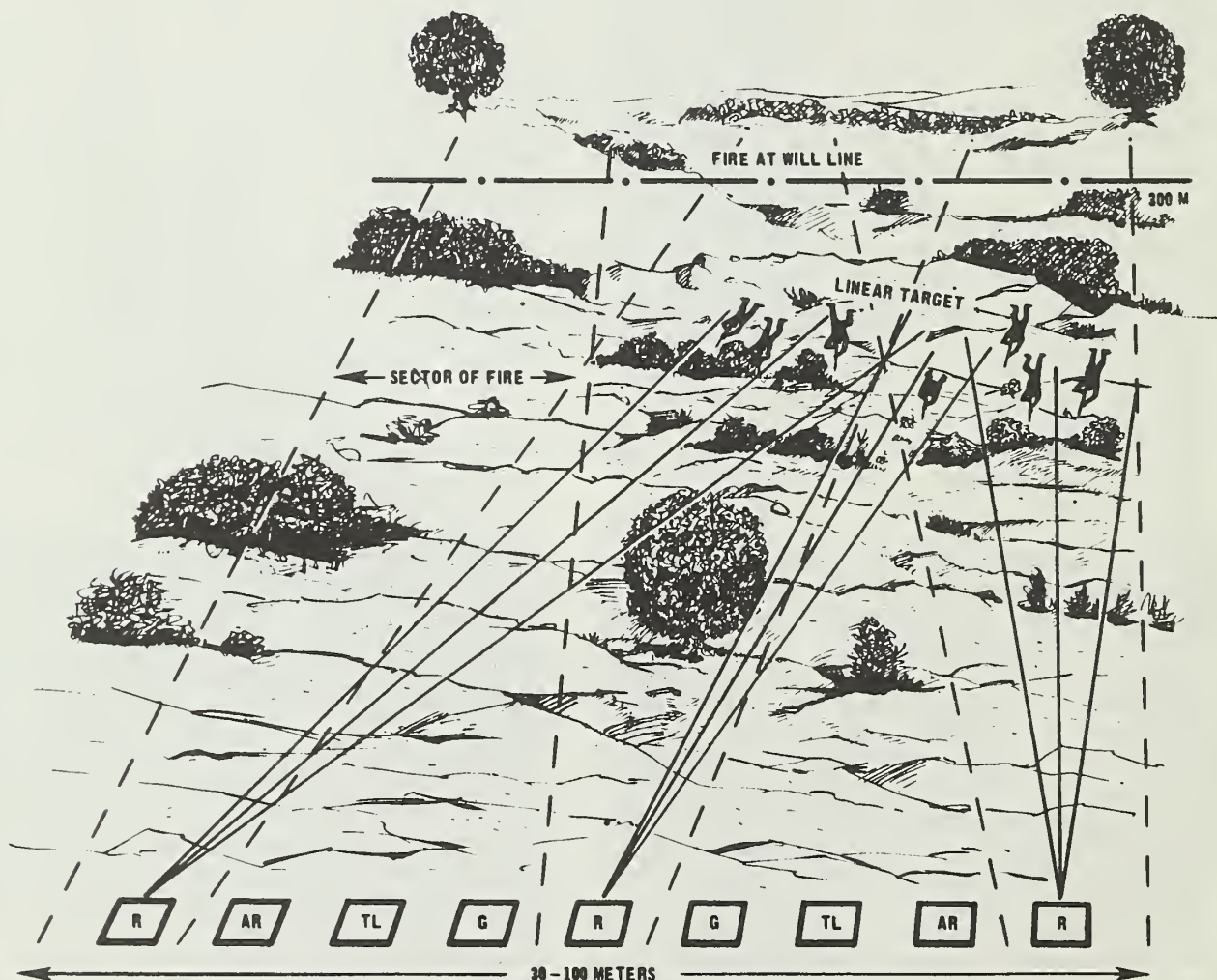


Figure 2

the key maneuver for the Infantry as well as the true test of small arms. Hence, it was essential that the assault be included. By careful design to include a considerable shortening of event times—with a consequent longer running time—the modeling of the assault was accomplished.

—Clearly, Infantry combat must be examined in the context of the individual Soldier. Individual tanks had been modeled before, but they are gross in comparison to the individual human being.

—The play of anti-personnel minefields has not previously been covered in detail. In the ASARS Battle Model, anti-personnel minefields are depicted realistically and the individual Soldier, if he locates a minefield, will have the options of breaching, traversing, or going around it, as he would have in real life.

—In combat, there are many more wounded than killed and many of these wounded can still contribute. For instance, in the defense, a man may be wounded in the leg and still be able to observe. Past tank models have played partial kills, but this modeling has not been attempted for human targets. Systems Analysis Group, working with Army Materiel Command agencies, was able to develop a set of algorithms which give a suitable picture of partial casualties to human beings.

—Since individual Soldiers have not heretofore been played, detailed individual fire control routines have not been developed. The conversion of the field manual instructions into a mathematical model suited for the computer proved to be a major task. The final Phase C flow charts are extensive and can cover 15 feet of wall when extended. Such detail is demanded in order to apply proper fires to a target. (See Figure 2).

—In other models, withdrawal may be played in a nominal manner, with the withdrawing unit being caused to disappear, so to speak. In the ASARS Battle Model, the unit withdraws each foot of the way and displaces to one of several preselected positions, depending on decision rules incorporated into the model.

A great deal has been learned from the ASARS Battle Model about modeling from both the technical and the administrative standpoints.

—The term “modeler” and “analyst” are related and sometimes may be considered as iden-

tical. However, modeling (in this case the creation of mathematical models) requires a special talent not available to all analysts. An alert individual well trained in the sciences is a potential model developer. It is neither necessary nor desirable to restrict choices to persons trained in operations research. Mathematical physicists and mathematicians are particularly adaptable. A military background is helpful, although by no means essential.

—In large complex computerized models, the individual who interfaces with the computer must understand as much about the model as the model developer. If not, conversion of that model into a computer program becomes almost impossible. During development of the ASARS Battle Model, computer specialists and analysts worked together from start to finish of a sub-model. The conventional relationship, in which an analyst develops a model and then turns it over to a programmer, whom he rarely sees, will not work in a complex effort such as the ASARS Battle Model development.

—The ASARS Battle Model is the first large, stochastic model that has been developed by the Army in-house. It has demonstrated the advantages of having the Army's own organization do its work. The developer can be more responsive to changed needs of the user and can have readier access to sources of information. Nevertheless, the contract method does have one big advantage. The limitation of funds restrains the tendency for model expansion. The contractor's product may not be as adequate as that of an in-house effort, but will be more likely to meet time limitations, since, in contract efforts, time is expressed in terms of the funding for the work. If we are to expand the in-house efforts, some means must be devised for controlling the tendency toward model expansion.

The time, effort, and resources invested in the ASARS Battle Model promise to give a positive return during the next year. The capability of an in-house organization, staffed by qualified military and civilian personnel trained in the sciences, to model a complex phase of ground combat has been demonstrated. The US Army will soon have, for the first time, a detailed model of small unit infantry combat. Though this is an important achievement in itself, it is particularly satisfying that the ASARS Battle Model was entirely an in-house development.

Combat Clothing and Equipment

One Idea Can Be Worth Up to \$25,000.

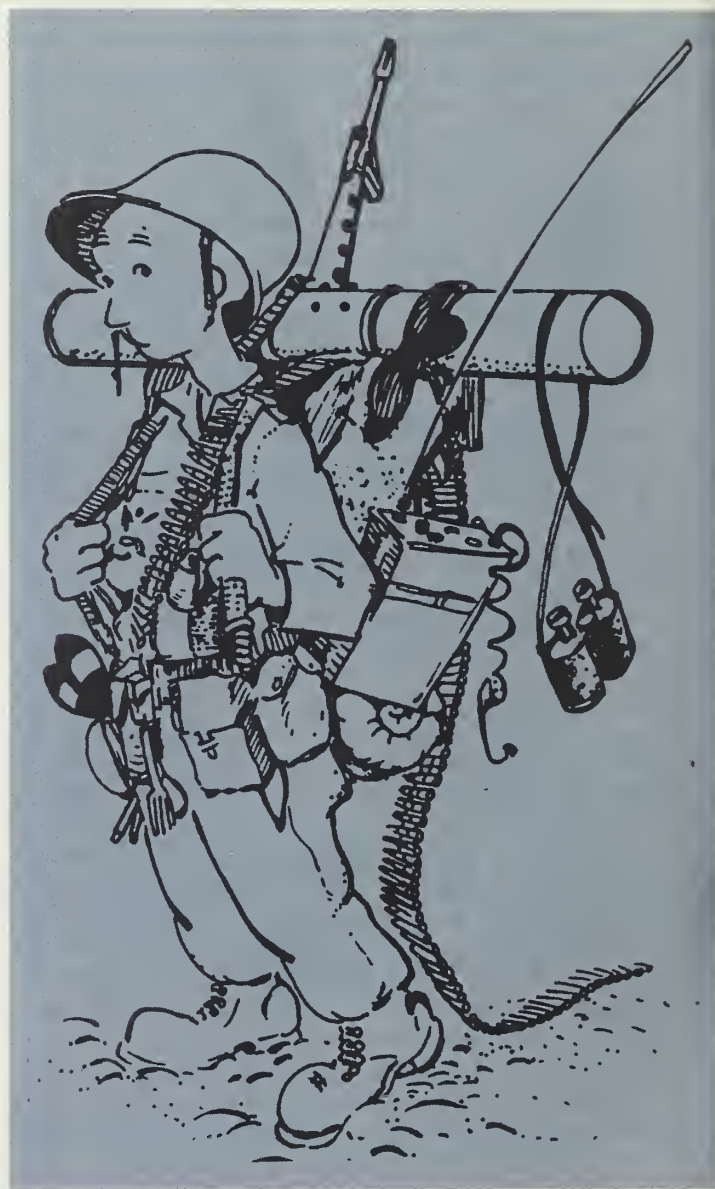
THE ARMY SOUNDING BOARD

What's a TASBIS? It's neither a weapons system nor a disease; it is the acronym for The Army Sounding Board for the Individual Soldier. Organized at the direction of former Army Chief of Staff General William C. Westmoreland, the Army Sounding Board is the direct link between the Soldier in the field and Army research and development laboratories. The purpose of the Sounding Board is to act on suggestions from Soldiers world-wide on combat clothing and equipment.

Each suggestion is considered by a board composed of combat experienced NCO's and officers. When required, experts from Army laboratories or private businesses and industry are consulted. After a suggestion has been thoroughly considered and evaluated, the suggester is personally informed on the action taken on this suggestion. For accepted ideas that improve effectiveness or morale of the Soldier or save the government money, cash awards are authorized. Many Soldiers have already received cash awards this way.

Suggestions to the Army Sounding Board have resulted in the adoption of a penlight, and improvements in decontaminating kits, lister bags, mine detectors, bayonets, AN/PRC-25 harnesses and many others. Suggestions from field Soldiers have very much influenced the characteristics of the new items under development such as the loadcarrying equipment, the squad radio, and the knife/bayonet.

All Soldiers are encouraged to submit their ideas or even general comments and opinions on the individual combat clothing and equipment issued them. Who knows, for a few sentences the reward may be as high as \$25,000, depending on the contribution made. All ideas and comments should be sent to The Army Sounding Board, USACDC Infantry Agency, Fort Benning, GA 31905.



Simulated Warfare at Combat Systems Group

By LTC James F. Bell

The first flight of a new aircraft provides a visible milestone of progress. Less spectacular are the plateaus achieved in other developmental work—but these may be equally significant. Such is the recent testing of an improved division-level war game model at the CDC Combat Systems Group War-Game Facility at Fort Leavenworth. This model, known as DIVWAG, will provide CDC with a computer-assisted, general-purpose, tactical war-gaming system for use in force composition and doctrine studies in mid and high intensity environments.

The essence of DIVWAG is a computer software package developed under contract by Computer Sciences Corporation. The model consists of an aggregation of experience and technical knowledge, detailed procedures, and computer software and hardware—an aggregation capable of simulating brief periods of combat for a precisely described division-size force engaging a precisely defined opponent. The model encompasses all six functions of land combat: intelligence, mobility, firepower, command, control and communications, combat service support, and personnel.

A description of some DIVWAG features may suggest the potential value of this model.

Prior to any game, a data base is prepared and loaded into the computer's random access memory. This constant data base is comprised of numerous tables which describe the detailed composition of the units to be gamed, their subordinate, the characteristics and capabilities of their weapons and equipment, and such

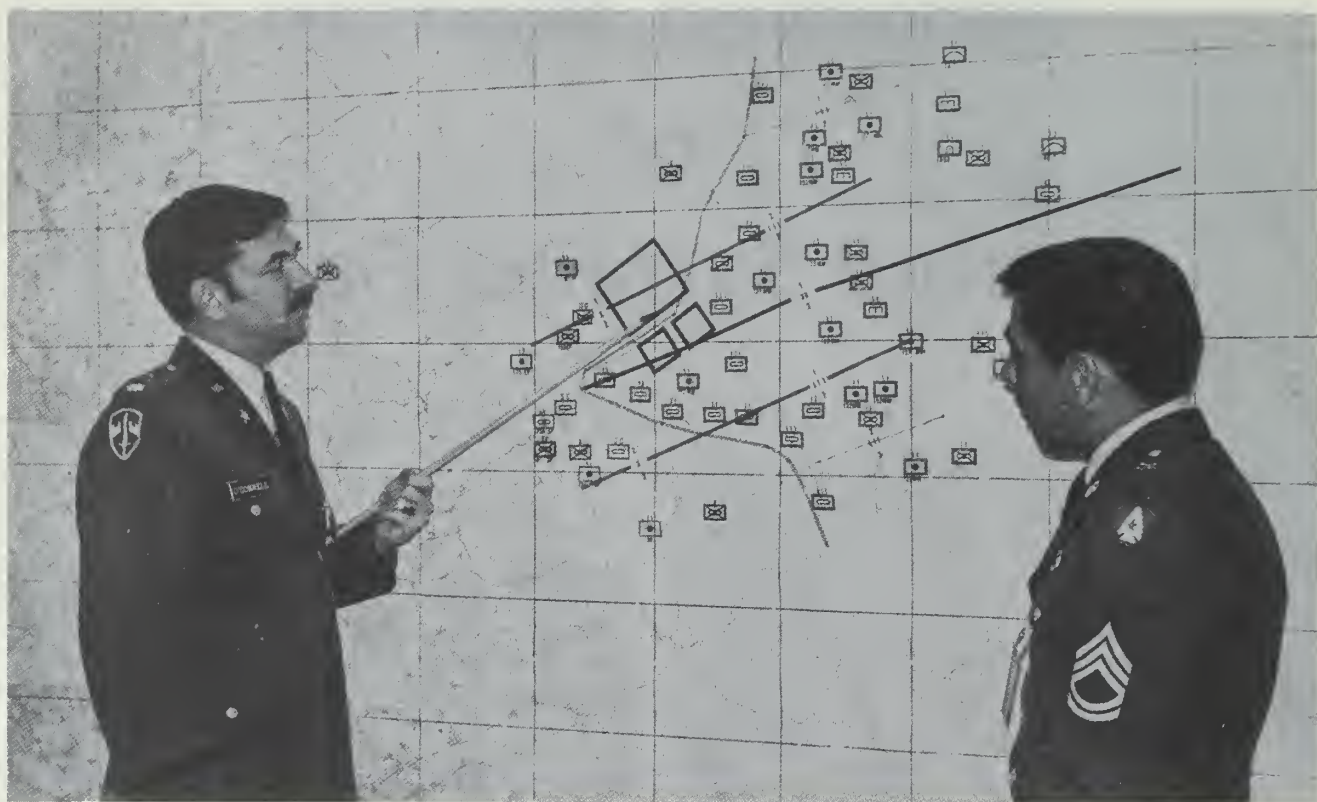
environmental factors as weather and terrain. In the conduct of a game, personnel acting as commanders and staffs of opposing forces provide an input analogous to operation orders for the units involved. These orders are written in a specially developed source language. The computer then acts on these orders, using stored programs pertinent to the ordered activities. This processing involves many referrals to the constant data base.

Each game is made up of a series of game periods. These represent increments of game time for which computer processing is feasible without any intervention by gaming personnel. Periods are terminated at the point where human evaluation, decision, and new orders are required. A period usually represents several hours of combat, or a longer increment when operations are of a stable nature.

Processing of the game period by the computer generally treats each event in sequence. The outcome of any one event can influence succeeding events. Hence, the model realistically portrays such functions as fire, movement, and resupply as integrated and interdependent activities. Event sequencing also permits detailed analysis in that it is possible to determine the precise location and status of any unit at any time during the game period.

The results of each period are provided to gamers in highly formatted printouts. Unit status reports include the location of each unit, and each unit's personnel and equipment strengths, activities, recent losses, and other

LTC Bell is currently assigned to the Combat Systems Group at Ft. Leavenworth, Kan.



Major James T. O'Connell, Jr., and SFC Jessie Ortiz of COMS Group War Game Division discuss a unit dimensioning problem during testing of the DIVWAG model.

data. Separate reports cover current intelligence holdings and the status of barriers. Other special reports are provided for detailed game analysis.

In the computer processing of each game period, four categories of software submodels are brought into play: intelligence and control, firepower, mobility, and combat service support.

The intelligence and control programs simulate the functions of surveillance, target acquisition, combat intelligence, and command, control, and communications. Intelligence information is acquired automatically from a variety of sources. These include active and passive ground sensors, air and ground visual observation, and photo reconnaissance. This information is processed and used to generate automatic requests for fire support on acquired targets, if appropriate. Fire mission requests are acted upon, using available artillery, close air support, and attack helicopters, in accordance with criteria and priorities contained in the constant data base. This submodel injects delays in processing to represent

time required for collection, dissemination, analysis, and decision-making. The model also produces an end-of-period summary report of intelligence holdings to aid gamers in preparing for the next period.

The firepower submodel provides the data needed to evaluate the effects of major weapon systems and to compare different mixes and types of weapons. It consists of three programs: ground combat, area fire, and air-ground engagement. Each program assesses damage and losses to target units. Each program also produces expenditures and consumption data for use in evaluating supply and transportation systems. Ground combat portrays the interaction of maneuver units employing direct-fire weapons. Both fire and movement are subjected to constraints imposed by adverse weather, terrain, and visibility. The ground combat simulation relies heavily on the input data describing target acquisition capabilities, weapon system characteristics—especially hit and kill probabilities

against various types of targets—and rates of fire. Area fire programs simulate scheduling and delivery of indirect fires; they also produce the resulting loss assessments. In addition to missions generated automatically by intelligence acquisitions, gamers may include specific fire missions as a part of their orders to units at the start of each period. Air-ground engagement simulates close air support, including the delivery of direct aerial fires by Army aircraft, and support by aircraft of other Services. This submodel determines the results of air attacks, computing both aircraft losses and target losses. Missions are generated automatically; also, they may be specifically ordered by gamer input, as with area fire missions. Aircraft are subject to attrition from enemy air defense systems when flight paths bring them within range. Aircraft on the ground are also vulnerable to enemy attack, as are the personnel, supplies, and equipment of any unit.

The mobility submodel encompasses movement by air and ground, both tactical and administrative. It also includes engineer activities that impede or enhance movement. In general, the movement of units is directly controlled by gamer personnel, and is simulated in response to specific movement orders received prior to each period. Acting on these orders, the model automatically simulates the moves, using available or otherwise specified transportation. It employs movement rates based on the types of vehicles involved, the type of formation, road surface and grade, and weather and visibility conditions. Special programs exist to realistically portray the key aspect of an airmobile assault. Engineering operations that involve the building, destruction, or breaching of obstacles may be specifically ordered by gamers. When obstacles are encountered during unit ground movement, appropriate engineer activity is automatically simulated. Time requirements and the availability of resources are reflected in this activity. Units affected are assessed an appropriate time delay in their movement. Movement of supplies are simulated automatically, and reflects interface with the combat service support (CSS) model.

The CSS model controls the simulated resupply of expendables and major end items as

well as simulated personnel replacement. The constant data inputs prior to each game specify the authorized supply levels and define the supply chain, type of distribution, and type of transportation to be used for each item. The model calculates order quantities based on a projected usage rate derived from each unit's recent experience. Distribution then is accomplished automatically in accordance with specified priorities. Expendables are back ordered when required. Before a unit can execute any activity, the required supply items must be present.

There are other important characteristics of the DIVWAG model which indicates a unique potential. They are highlighted as follows:

A battalion level of resolution is normal. However, the level of resolution can be varied to meet the needs of a specific game. For example, the dispersion and decentralization inherent in covering force missions may indicate a need for company-level resolution. Changes in resolution level can be made during the play of a game by ordering the attachment or detachment of specific units.

The model makes only limited use of Monte Carlo techniques in which decisions reflect chance variations. In the comparison of game results, most differences that appear can be traced to specific differences in input data.

The model design reflects an orientation to user needs. It is not essential that all or even most gamer personnel have technical automatic data processing (ADP) or operation research/systems analysis (ORSA) knowledge. In conducting games, player input employs a comprehensive, readily-learned source language. Output to gamers is well formatted for ease of use. Nevertheless, a lengthy period of orientation is required for gamers to become fully effective, due, in part, to the overall complexity of the model and the extensive data base requirements.

Theoretical capabilities aside, one question is paramount: Does this war-game model work, and does it produce credible results? Recent testing has revealed that it does perform as intended in most of its major aspects. More than five years of developmental effort and an investment of several hundred thousand dollars have produced desired results.



The site of DIVWAG development is the War-Game Facility at Fort Leavenworth. Formerly a stable, the building has been renovated and equipped specifically for war-game use at a cost of \$300,000. Six identical game rooms will permit simultaneous conduct of two separate, two sided war games.

The DIVWAG model gives every indication of enhancing the CDC mission of determining the force structure needed for future land warfare. It promises to be an important tool for providing quantitative and objective evaluations of different mixes of men and equipment employed in various battle environments. The model enables these evaluations to be obtained much quicker and cheaper than is possible in field testing. Additionally, it will provide some valid answers and insights that would otherwise be possible only through field testing. A key role for DIVWAG will be to help insure selection of only the most promising force mixes for more realistic and costly "live" evaluation.



At SSL: Putting It All Together

By William V. Kennedy

Data and recommendations that can be put to work immediately to solve the Army's problems are the "meat and potatoes" of the Army study system.

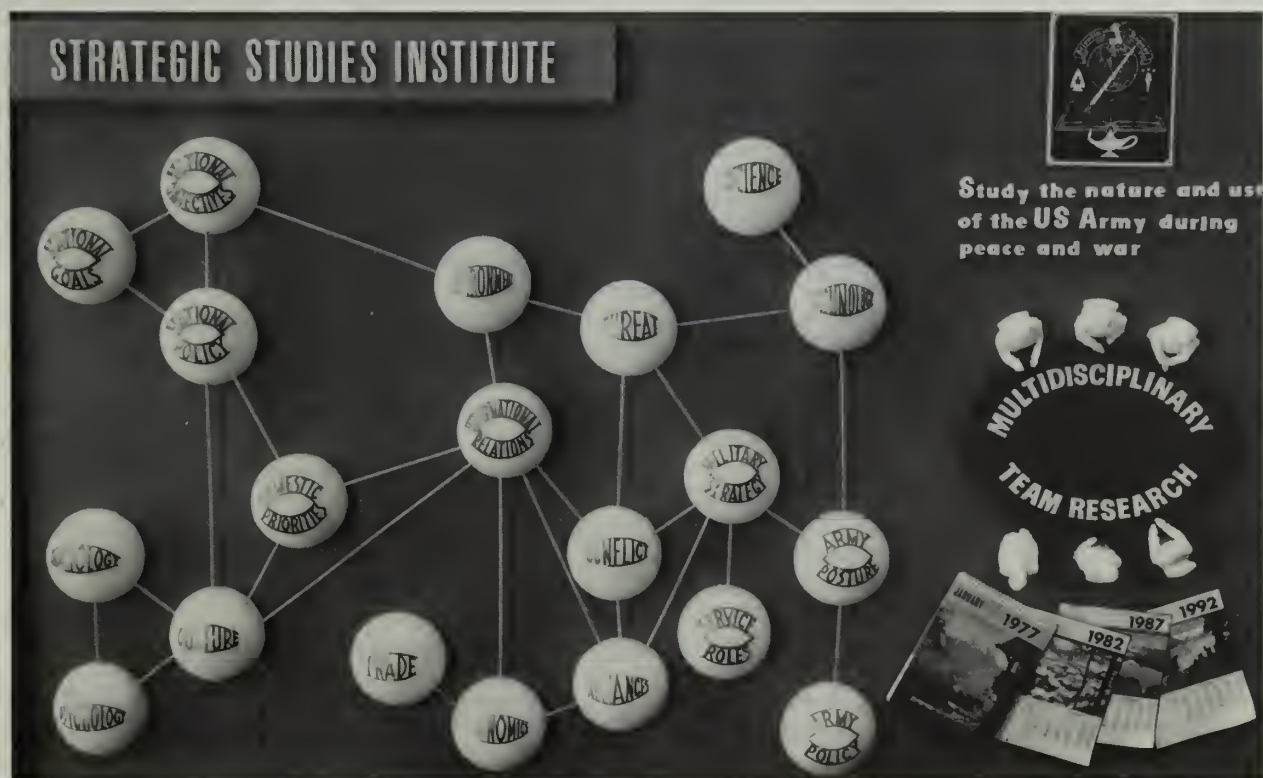
USACDC's Strategic Studies Institute at Carlisle Barracks, Pa., recently completed a series of studies that provided just such a bill of fare. As the products of a close relationship

Mr. Kennedy is currently assigned as Military Operations Research Analyst at the Strategic Studies Institute at Carlisle Barracks, Pa.

among an Army research institute, the US Army War College, and the professional military journals, the SSI studies provide some useful lessons for the conduct of future studies.

The studies concerned one of the most important problems confronting US strategic planners today: What can be done to enable the Army National Guard and the Army Reserve to meet the unprecedented goals for rapid deployment now being set for them in contingency plans?

The first study of the series was Size and Structure of the Active Army Strategic Reserve (SASR). The study was produced for the Office



SSI considers all interrelated aspects to produce strategic studies for a changing world.

of the Deputy Chief of Staff for Military Operations (ODCSOPS), Department of the Army. One of its purposes was to measure the existing capabilities of the Guard and Reserve forces.

The SASR study was completed in 1969. Data produced by the study resulted in a readjustment of Department of the Army and Department of Defense readiness goals for major units of the National Guard and Reserve. Identification of these more realistic goals resulted, in turn, in directing attention to problems of individual and small unit readiness.

This search for more specific answers began with the initial phase of CDC's CONAF study (*Conceptual Design for the Army in the Field*). It continued as part of another ODCSOPS Study, *Alternative Strategies for Variant US Military Resource Postures* (ALTSTRAT).

In March 1971, CDC was directed by then Under Secretary of the Army Thaddeus R. Beal to expand the SSI Guard and Reserve study effect into a major Department of the Army study with ODCSOPS designated as the study sponsor. COL. Thomas A. Lowe was designated chief of the study team. Originally known as "Alternatives for Improved Army Forces Capabilities" the final report of the study was published on 15 May 1972 as *The Army Study of the Guard and Reserve Forces*.

RAPID ACCEPTANCE

"The most unusual feature of this overall study effort," COL. Lowe points out, "has been the rapidity with which a large proportion of the study recommendations have been ordered implemented by the Department of the Army and subordinate agencies." These have included recommendations made at all of the interim phases of the several studies.

As an example, a recommendation was advanced in the initial phase of the CONAF study that additional paid training assemblies be made available to commanders and staff members responsible for planning the weekend training of selected Guard and Reserve units. The recommendation was adopted by the National Guard Bureau while the final Guard and Reserve study was still in progress and by the Army Reserve shortly after the recommendation was repeated in the final study.

Although considered to be the most controversial of all the study recommendations, a proposal to limit tenure of officer unit assignments is now being considered for application to the

Army Reserve. Extension of this and related recommendations to the National Guard would mean that for the first time in US history a citizen Soldier who moves from one section of the country to another would be assured of equal opportunity for service and advancement in his new locale. A recommendation that may eventually save the Army up to \$100 million annually provides an especially good insight into how the study recommendations were developed and their potential value.

During an SSI visit to Headquarters, Continental Army Command, a CONARC civilian employee pointed out that while there were large numbers of Guard and Reserve units that had too little time to prepare and present training, there were also several categories of units that could not make full use of the required training time program.

The list of units supplied by the CONARC staff member was discussed with Army National Guard and Army Reserve general officers attending War College courses of Instruction. These officers not only confirmed the suggestion encountered at CONARC but added additional categories of units. From further analysis it was determined that as much as \$100 million annually might be saved by adjusting the training schedule of these units to a program more suited to their needs and anticipated usefulness.

A survey is now underway by the Office of Reserve Components, DA, to determine how the savings indicated by the SSI studies can best be achieved.

In all, 54 general officers of the Army National Guard and the Army Reserve participated in development of the SSI Studies.

In addition to the general officers, a succession of War College resident and non-resident students undertook research projects contributing to the study. These included Regular Army officers with Reserve component experience as well as National Guard and Reserve officers in successive War College classes.

GETTING THE IDEAS OUT

"A major factor in producing the high degree of acceptability of the successive SSI Guard and Reserve Study efforts," COL Lowe said, "is the use made by SSI of the professional military journals as sounding boards for new ideas."

At the completion of the SASR and initial CONAF studies a substantial part of the findings in the Guard and Reserve area were




AWC Faculty and Students are a valuable resource in study formulation and evaluation.

discussed in an article published in *Military Review*, the professional journal of the US Army. This article resulted in an invitation by the Office of the Assistant Secretary of Defense (System Analysis) to discuss the SSI findings in greater detail. The results of this discussion were reflected in subsequent study directives.

At later stages of the Guard and Reserve study, articles covering aspects of the study were published in *Ordnance, Armor, Army* and the U.S. Naval Institute *Proceedings*.

In addition to the published articles, COL Lowe conducted an extensive series of briefings before Active Army and Reserve component audiences, including the student bodies of the Army War College and the US Army Command and General Staff College.

In COL. Lowe's opinion "it was this broad discussion that prepared the way for the acceptance of ideas that once had been considered too controversial even to be considered. It would have been almost impossible to accomplish this frank and informal interchange in any atmosphere other than an academic environment readily accessible to the research organization concerned."

The Guard and Reserve Studies have demonstrated that the collocation of SSI and the War College, and the use of the professional military journals to communicate with an expert audience is a winning combination for producing better ideas for a better Army. 

Field Manual Production

By LTC Winfield C. Frank

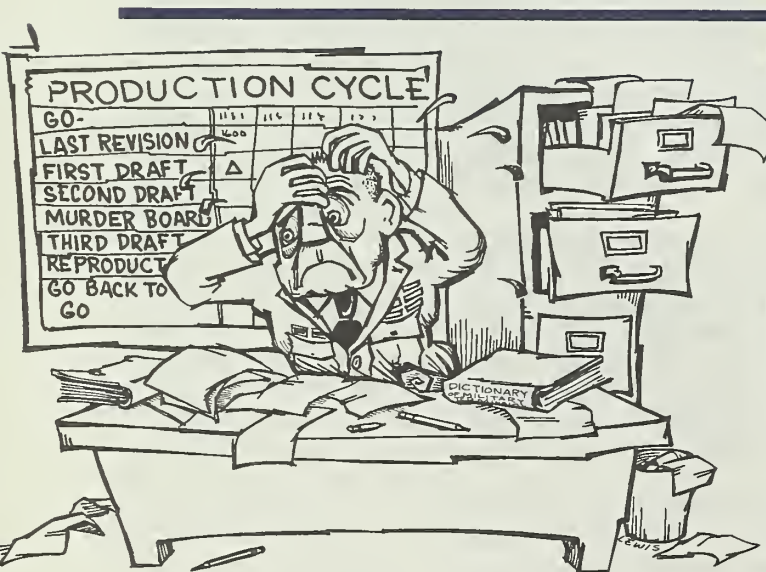
A basic CDC mission is getting the latest doctrine to the Soldier in the field. To accomplish this, CDC oversees the production of 238 doctrinal field manuals for the US Army. CDC has purified the field manual production cycle and captured new field manual production requirements with the latest revision of USACDC Pamphlet 310-8, *Guide for Field Manual Writers*, dated 1 August 1970. The pamphlet with a new title, *Guide for Field Manual Production*, should be published in February.

This pamphlet will make the difficult task of field manual production easier. A newly assigned project officer will have the answer to the question—"Where do I start?" The new pamphlet covers field manual preparation, style, format, coordination, and review procedures, and was prepared expressly to assist project officers in the development and production of field manuals. And, it will be beneficial to editors, supervisors, and graphics personnel as well. After reading this pamphlet the project officer can—"Go to it", "Do it", "Review it", and "Let it go". He will be able to concentrate on manual content and innovations.

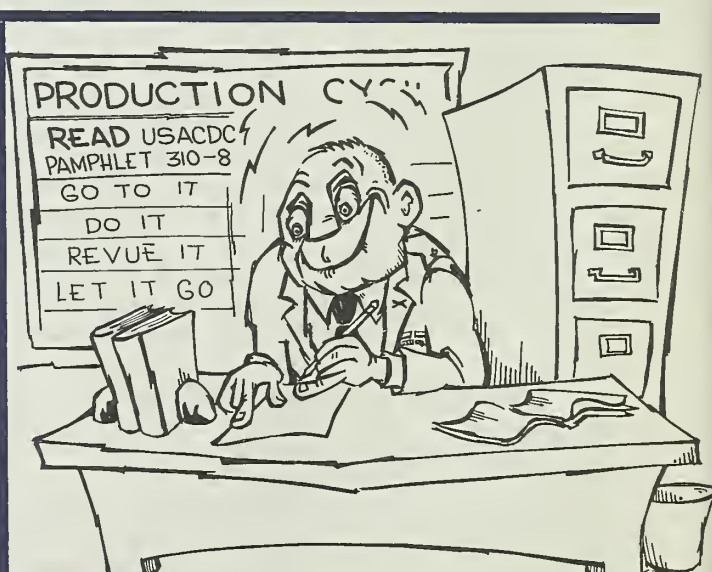
CONFOR Gp was tasked to revise USACDC Pam 310-8 on 27 July 1972. Portions of the CONFOR Gp Literature SOP and the Maintenance Agency Illustrations Guide were combined with the old USACDC Pam 310-8 to develop the initial draft of the new pamphlet. All groups and agencies of the CDC community have contributed to the final product.

With the aid of this pamphlet and other publications, field manual production should be accomplished in a more effective manner. Another publication soon to be published is USACDC Pamphlet 310-10, "Guide to Military Question Writing". This new guide assists in the preparation of questions and questionnaire design for obtaining information from the field. It was prepared by Mr. William Hartness of the Special Operations Agency.

These pamphlets may be of value to other commands within the United States Army and consideration will be given to making them DA publications.



"WHERE DO I START?"



"NOW I KNOW"



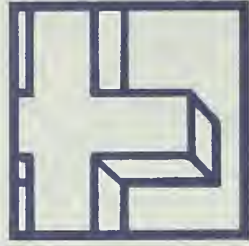
The Point of the Arrow

JANUARY QUESTIONS

1. The Soviet Rifle Squad consists of men.
2. The largest weapon in the Soviet Rifle Squad is the
3. The is the main battle tank of the Soviet Army. It mounts a mm machine gun and a coaxial mm machine gun.
4. The basic infantry shoulder-fired weapon in the Soviet Army is the
5. The Soviet Army's main battle tank has a smooth bore gun that is mm in size.

DECEMBER ANSWERS

1. The *Regiment* is the lowest level for combined arms teams in Soviet forces.
2. When in the approach march or not in contact with the enemy, the division forms an air defense *artillery* group commanded by the *Division Air Defense Artillery* officer.
3. In combat, or when contact with the enemy is imminent, air defense is controlled by the *commander of the unit of assignment*.
4. The Soviets, by their doctrine, require a 3 to 1 superiority ratio for the attack.
5. The *MIG 17* is the standard close air support aircraft employed by the Soviets.



For God and Country

Father everlasting, through whose favor we have come to the beginning of the new year, we pause before Thee in gratitude at the remembrance of Thy mercies.

We rejoice in the ways we have traveled. Thy love has led us along sunlit paths of quiet joy. Thy Spirit has supported us through shadowed valleys of humiliation; and Thy presence has encouraged us in tempestuous seas of peril.

We thank Thee for the friends Thou hast given us. They have been as a refreshing oasis in the desert, as a shade from the burning heat, and as a shelter in the time of storm.

We praise Thee for every satisfying experience. For harvests gathered, victories won, progress made, we lift our hearts in gratitude.

And now Thou hast brought us to the dawn for this new year. Let Thy Spirit lead us along the unblazed trail. Be our companion as we trudge the dusty lane or hasten over the broad highway. Grant us Thy presence as we walk in familiar ways or engage in fresh experience.

Teach us to find satisfaction in life's changing scenes. We would rejoice not alone in days that flow like a song but in times that demand strenuous effort and fierce battle, not alone in the quiet dawn and stormy heaven but in days that are overcast and nights that are storm-whipped.

Give us an understanding of life's deeper meaning. Make us sensitive to spiritual overtones. Open our eyes to the beauty that lies in common things. Awaken our minds to the joy to be gained through high endeavor.

Strengthen our hearts to face with courage all that may befall us along the unknown trail. Lead us in faith and hope and love. And grant us unfailing confidence in Thy Eternal Goodness, so at the end of this year we might rest in the assurance that we have spent its days in worthy causes and in service to a greater good than self. Amen.

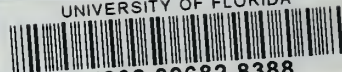


FORT MONROE --- FUTURE HOME OF TRADOC HEADQUARTERS

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LT Gary R. Steimer

CORRECTION: The article "Automated Decisions", on page 16 of the December issue was written by Major Walter J. Chrobak. The article, "Hanging Tight", on page 20 in the same issue was written by Mr. Christmas A. Malami. The *Arrowhead* regrets the mix-up in the by lines of these two articles.



CONCEPT OF ORGANIZATION

